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EXAMINER

YIGDALL, MICHAEL J

ART UNIT	PAPER NUMBER
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2122

DATE MAILED: 06/29/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application

09/753,279

Applicant(s)

HIBDON, GREGORY

Examiner

Michael J. Yigdal

Art Unit

2122

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3,5-12,14-18 and 20-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-12,14-18 and 20-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This Office action is in reply to Applicant's response and amendment dated April 16, 2004. Claims 1-3, 5-12, 14-18 and 20-24 remain pending.

### *Response to Arguments*

2. Applicant's arguments have been fully considered but they are not persuasive.
3. Applicant acknowledges that in Tanguay, "the user may select specific macros for expansion or not," and yet contends that "there is nothing in Tanguay to suggest that the user may select a specific type of macro" (see page 10, paragraph 3). The Examiner submits, however, that because the user may select specific macros to expand, the user may, in fact, select a specific type of macro to expand.

The limitations recited in claim 1, and similarly in claims 10 and 16, "writing expanded macro tokens to an output file if said macro is of said specific type of macro," and "writing an original macro call to said output file if said macro is not said specific type of macro," are anticipated by Tanguay as presented below.

Tanguay discloses a selective preprocessor for writing original code, i.e. original macro calls, and expanded macros to an output file (see column 4, lines 35-47). Specific macros are expanded and others are contracted, i.e. not expanded, according to user input (see column 4, lines 48-56). In addition to the selective code viewer, Tanguay discloses a code processing program, which may be part of a compiler, that performs the same selection function as provided by the user input (see column 4, lines 57-62). In other words, specific macros, and likewise specific types of macros, may be selected for expansion when compiling the source code.

4. In response to Applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

5. Applicant submits that Beausang discloses scan insertion but not macro expansion, and that neither Tanguay nor Beausang disclose the expansion of macros related to scan (see page 11, paragraph 1). Applicant further contends that there is no suggestion in Tanguay that the system be applied to HDL that includes scan macros, or that scan macros be systematically handled differently from any other macros.

The Examiner respectfully disagrees with Applicant's characterization of the references. Beausang discloses scan insertion in the context of design-for-test, i.e. testing or debugging (see the title and abstract), using a high level HDL (see column 1, lines 36-45). The scan cells of Beausang are analogous to scan macros. Likewise, Tanguay discloses selective macro expansion used to simplify debugging (see column 1, line 61 to column 2, line 3), also using a high level language (see column 4, line 65 to column 5, line 1).

Tanguay further discloses using any language that supports preprocessing (see column 5, lines 37-42) and expanding any macro (see column 2, lines 42-44). The system of Tanguay would be operative then to selectively expand scan macros from source code written in an HDL. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an HDL along with scan cells or scan macros as taught by Beausang in the selective macro expansion system of Tanguay. The combination of Tanguay and Beausang

would have been obvious because one of ordinary skill in the art would have been motivated to simplify the debugging or testing of a hardware design.

6. Applicant also contends that Tanguay does not relate to multifaceted tokens and that Beausang does not disclose multifaceted tokens (see page 12, paragraph 1). Applicant states that “the multifaceted tokens can be hidden from or made visible to a subsequent parsing process” and that “they can be hidden by being marked as hidden and they can be made visible by expanding the plurality of macro definitions” (see page 11, paragraph 3).

However, Tanguay discloses marking the source code to indicate macros that may be selectively contracted, i.e. made hidden, or expanded, i.e. made visible, to a subsequent process such as compiling (see column 4, lines 52-62). Therefore, the tokens of Tanguay (see column 5, lines 14-16) corresponding to the macros, which are in this manner selectively made visible or hidden, are considered multifaceted tokens.

#### ***Claim Rejections - 35 USC § 102***

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 1-3, 10-12 and 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. No. 5,946,488 to Tanguay et al. (hereinafter “Tanguay”).

With respect to claim 1 (currently amended), Tanguay discloses a method comprising:

(a) reading a line of data from a file containing source code written in a high level language (see block 306 in FIG. 3 and column 5, lines 9-13, which shows reading lines from a

source file, and column 4, line 65 to column 5, line 1, which shows that the source code is written in a high level language);

(b) generating a stream of tokens from said line of data (see block 308 in FIG. 3 and column 5, lines 14-16, which shows translating the source code into a stream of tokens), said stream of tokens representing any of a specific type of macro in said line of data as being expanded while other types of macros are not expanded (see column 1, lines 61-66, which shows selecting specific macros for expansion, e.g. based on the type of the macro);

(c) parsing said stream of tokens (see block 310 in FIG. 3 and column 5, lines 17-18, which shows parsing the stream of tokens to execute preprocessing directives and expand macros);

(d) inserting commands representing operations to be performed by a macro into said stream of tokens if a macro is present (see column 5, lines 61-62, which shows expanding a macro by inserting the macro definition, i.e. into the stream of tokens).

(e) writing expanded macro tokens to said output file if said macro is of said specific type of macro (see selective preprocessor 200 in FIG. 2 and column 4, lines 35-47, which shows writing code in expanded form, i.e. code including expanded macro tokens, to an output file; see also column 4, lines 48-62, which further shows expanding specific macros based on user input, e.g. according to the type of macro, and using the same selection function in a process such as compilation); and

(f) writing an original macro call to said output file if said macro is not said specific type of macro (see selective preprocessor 200 in FIG. 2 and column 4, lines 35-47, which shows writing original code, i.e. code including original macro calls, to an output file; see also column

4, lines 48-62, which further shows expanding specific macros based on user input, e.g. according to the type of macro, and using the same selection function in a process such as compilation).

With respect to claim 2 (original), Tanguay further discloses the limitation wherein said generating a stream of tokens further comprises:

(a) determining whether tokens are present in either an input file, a look-ahead buffer, or a macro expansion list (see column 8, lines 61-63, which shows reading new tokens from a source file; see also column 9, lines 13-21, which shows a string table serving as a look-ahead buffer, and column 9, lines 28-34, which shows a representation comprising macro expansion operators, i.e. a macro expansion list); and

(b) responsive to finding tokens, reading said tokens first from said look-ahead buffer, then from said macro expansion list, then from said input file (see column 9, lines 13-21, which shows that tokens are first identified from the string table serving as a look-ahead buffer, column 9, lines 39-45, which shows that the string table then identifies tokens in macro expansions, and column 8, lines 61-63, which shows that new tokens, i.e. tokens not yet identified, are read from the source file);

(c) presenting said tokens to a parser so that any macro in said line of data appears to have been expanded (see column 9, lines 53-59, which shows presenting the tokens, including the expanded code, to either a viewer or a compiler, i.e. a parser).

With respect to claim 3 (currently amended), Tanguay further discloses the limitation wherein said parsing further comprises:

- (a) reading a token (see column 8, lines 61-67, which shows reading tokens);
- (b) determining a type of said read token (see column 8, lines 61-67, which shows determining the type of each new token);
- (c) responsive to determining that said read token is an end-of-line, processing an input line of tokens (see column 8, lines 61-67, which shows identifying syntactic elements, e.g. end-of-line tokens, and column 5, lines 12-16, which further shows that the tokens are processed in terms of input lines);
- (d) responsive to determining that said read token is not a symbol, adding said read token to a current line token list (see column 9, lines 7-12, which shows adding tokens to a table or list, and column 11, lines 10-16, which shows a line database for storing information related to lines, i.e. lines comprised of tokens);
- (e) responsive to determining that said read token is a symbol that indicates a beginning of a macro definition, recording a macro name and said macro definition and adding said read token to a look-ahead buffer (see column 9, lines 28-34, which shows identifying the beginning of a macro expansion or definition, and column 9, lines 13-21, which shows adding tokens to a string table serving as a look-ahead buffer; see also column 11, lines 33-36, which shows a macro database having records of macro references and expansions, i.e. macro names and definitions); and
- (f) responsive to determining that said read token is a symbol that does not indicate a beginning of a macro definition, adding said read token to a current line token list (see column 9, lines 7-12, which shows adding tokens to a table or list, and column 11, lines 10-16, which shows a line database for storing information related to lines, i.e. lines comprised of tokens).



With respect to claim 10 (currently amended), Tanguay discloses a system comprising:

(a) a storage device having stored therein one or more routines for selectively expanding macros within source code (see memory 130 in FIG. 1, which shows a storage device having a selective preprocessor; see also column 1, lines 61-66, which shows selectively expanding macros in source code); and

(b) a processor coupled to the storage device for executing the one or more routines for selectively expanding macros within source code (see CPU 170 and bus 180 in FIG. 1) which, when executing said routine:

(i) reads a line of data from a file containing source code written in a high level language (see the explanation for step (a) of claim 1 set forth above);

(ii) generates a stream of tokens from said line of data, said stream of tokens representing any of a specific type of macro in said line of data as being expanded while other types of macros are not expanded (see the explanation for step (b) of claim 1 set forth above);

(iii) parses said stream of tokens (see the explanation for step (c) of claim 1 set forth above);

(iv) inserts commands representing operations to be performed by a macro into said stream of tokens if a macro is present (see the explanation for step (d) of claim 1 set forth above);

(v) writes expanded macro tokens to an output file if said macro is of said specific type of macro (see the explanation for step (e) of claim 1 set forth above); and

(vi) writes an original macro call to said output file if said macro is not said specific type of macro (see the explanation for step (f) of claim 1 set forth above).

With respect to claim 11 (original), see the explanation for claim 2 set forth above.

With respect to claim 12 (currently amended), see the explanation for claim 3 set forth above.

With respect to claim 16 (currently amended), see the explanation for claim 10 set forth above.

With respect to claim 17 (original), see the explanation for claim 2 set forth above.

With respect to claim 18 (currently amended), see the explanation for claim 3 above.

***Claim Rejections - 35 USC § 103***

9. Claims 5-9, 14, 15 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanguay, as applied to claims 1, 10 and 16 above, respectively, in view of U.S. Pat. No. 5,903,466 to Beausang et al. (hereinafter "Beausang").

With respect to claim 5 (original), although Tanguay discloses using source code written in any language that supports preprocessing, which would encompass hardware description languages (see column 5, lines 37-42), Tanguay does not expressly disclose the limitation wherein said source code written in a high level language comprises a hardware description language (HDL) for representing hardware designs.

However, Beausang discloses the limitation above in a system that provides constraint-based or selective scan insertion for implementing design-for-test within an integrated circuit design (see the title and abstract; see also column 1, lines 36-45, which shows exemplary hardware description languages).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use hardware description languages as taught by Beausang in the system of Tanguay, for the purpose of debugging or testing a hardware design (see Tanguay, column 2, lines 2-3, which shows using the system for debugging).

With respect to claim 6 (original), although Tanguay discloses expanding any macro, which would encompass scan macros (see column 2, lines 42-44), Tanguay does not expressly disclose the limitation wherein said specific type of macro comprises a scan macro.

However, Beausang discloses the limitation above in a system that provides constraint-based or selective scan insertion for implementing design-for-test within an integrated circuit design (see the title and abstract; see also column 5, lines 1-7, which shows the insertion or expansion of scan cells or macros).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use scan macros as taught by Beausang in the system of Tanguay, for the purpose of debugging or testing a hardware design (see Tanguay, column 2, lines 2-3, which shows using the system for debugging).

With respect to claim 7 (original), Tanguay discloses a method for debugging software (see column 2, lines 2-3) comprising:

(a) reading source code, the source code including a plurality of macro definitions (see column 8, lines 61-63, which shows reading source code, and column 1, lines 61-66, which further shows that the source code includes macro definitions);

(b) creating a token stream based on the source code that includes multifaceted tokens that can be hidden from or made visible to a subsequent parsing process by expanding the plurality of macro definitions and making tokens associated with some macros visible to the subsequent parsing process and marking other tokens as hidden (see column 5, lines 14-16, which shows translating the source code into a stream of tokens; see also column 4, lines 52-62, which shows expanding and contracting macro definitions to make the corresponding tokens visible and hidden, respectively, to a subsequent process such as compilation);

(c) performing macro expansion by parsing those of the multifaceted tokens that are visible to the parser and adding appropriate commands (see column 5, lines 17-18, which shows parsing the stream of tokens to execute preprocessing directives and expand macros, and column 5, lines 61-62, which shows expanding a macro by adding the macro definition, i.e. to the token stream); and

(d) generating an expanded source code file containing expanded versions of the macro definitions which are selected but that omits expanded versions of those that are not selected (see column 4, lines 35-47, which shows a selective preprocessor for generating an expanded source code file having the original code or the original code with expanded macro definitions).

Tanguay does not disclose expressly the limitations recited in the claim wherein:

(i) the source code is a hardware description language (HDL) representation of a hardware design;

- (ii) some of the macros relate to scan insertion;
- (iii) scan commands are added to the representation; and
- (iv) the output file is a scan inserted HDL file.

However, Beausang discloses the limitations above in a system that provides constraint-based or selective scan insertion for implementing design-for-test within an integrated circuit design (see the title and abstract; see also column 1, lines 36-45, which shows exemplary hardware description languages; see also column 5, lines 1-7, which shows the insertion or expansion of scan cells or macros; see also column 15, lines 21-26, which shows the output of a scannable netlist, i.e. a scan inserted HDL file).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the features taught by Beausang in the system of Tanguay, for the purpose of debugging or testing a hardware design (see Tanguay, column 2, lines 2-3, which shows using the system for debugging).

With respect to claim 8 (original), although Tanguay discloses using a high level language (see column 4, line 65 to column 5, line 1), Tanguay does not expressly disclose the limitation wherein said HDL file comprises a high level language

However, Beausang further discloses the limitation above in a system that provides constraint-based or selective scan insertion for implementing design-for-test within an integrated circuit design (see the title and abstract; see also column 1, lines 36-45, which shows high level languages).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an HDL comprising a high level language as taught by Beausang in the system

of Tanguay, for the purpose of debugging or testing a hardware design (see Tanguay, column 2, lines 2-3, which shows using the system for debugging).

With respect to claim 9 (original), although Tanguay discloses using source code written in any language that supports preprocessing, which would encompass hardware designs and integrated circuit designs (see column 5, lines 37-42), Tanguay does not expressly disclose the limitation wherein said hardware design represents an integrated circuit design.

However, Beausang further discloses the limitation above in a system that provides constraint-based or selective scan insertion for implementing design-for-test within an integrated circuit design (see the title and abstract; see also column 1, lines 36-45, which shows hardware description languages for representing integrated circuit designs).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use integrated circuit designs as taught by Beausang in the system of Tanguay, for the purpose of debugging or testing a hardware design (see Tanguay, column 2, lines 2-3, which shows using the system for debugging).

With respect to claim 14 (original), see the explanation for claim 5 set forth above.

With respect to claim 15 (original), see the explanation for claim 6 set forth above.

With respect to claim 20 (original), see the explanation for claim 5 set forth above.

With respect to claim 21 (original), see the explanation for claim 6 set forth above.

With respect to claim 22 (original), see the explanation for claim 7 set forth above. Note that Tanguay further discloses a machine-readable medium (see memory 130 in FIG. 1) and a processor (see CPU 170 in FIG. 1).

With respect to claim 23 (original), see the explanation for claim 8 set forth above.

With respect to claim 24 (original), see the explanation for claim 9 set forth above.

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Yigdall whose telephone number is (703) 305-0352. The examiner can normally be reached on Monday through Friday from 7:30am to 4:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (703) 305-4552. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MY

Michael J. Yigdall  
Examiner  
Art Unit 2122

mjy  
June 14, 2004

  
TUAN DAM  
SUPERVISORY PATENT EXAMINER